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Date: FEBRUARY 17, 2004

To: EXAMINER  
U.S. PATENT AND TRADEMARK OFFICE

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Client/Matter No.: PHUS 010508 (7790/338)

# of Pages: 17  
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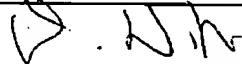
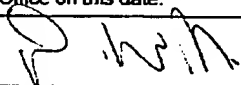
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<b>TRANSMITTAL FORM</b>  <i>(to be used for all correspondence after initial filing)</i>	Attorney Docket No.	PHUS 010508 (7790/338)
	Application Number	09/970,960
	Filing Date	OCT BER 4, 2001
	First Named Inventor	MICHAEL THOMAS SWAB
	Group Art Unit	2668
	Examiner	SPEARS, E.J.

ENCLOSURES (check all that apply)		
<input type="checkbox"/> Amendment <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s)  <input type="checkbox"/> Status Letter  <input type="checkbox"/> Petition for Extension of Time Request (duplic) <input type="checkbox"/> Express Abandonment Request  <input type="checkbox"/> Information Disclosure Statement, PTO-1449, art <input type="checkbox"/> Certified Copy of Priority Document(s)  <input type="checkbox"/> Response to Missing Parts/Incomplete Application	<input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawings: <input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Petition Routing Slip (PTO/SB/69) and Accompanying Petition <input type="checkbox"/> To Convert a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Small Entity Statement <input type="checkbox"/> Request of Refund	<input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Brief  <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Post Card Receipt <input type="checkbox"/> Additional Enclosure(s) (please identify below): <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div>
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Total		Minus		0	x \$9=	0		x \$18=	
Indep.		Minus		0	x \$43	0		x \$88	
First Presentation of Multiple Dep. Claim					+ \$145	—		+ \$290=	
					total add'l fee	\$ 0		total add'l fee	\$

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Firm or Individual name	DARRIN WESLEY HARRIS Registration No. 40,636 CARDINAL LAW GROUP 1603 Orrington Avenue, Suite 2000 Evanston, IL 60201		
Signature		Date	February 17, 2004
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PATENT  
Case No. PHUS010508  
(7790/338)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re patent application of:

MICHAEL THOMAS SWAB

Serial No.: 09/970,960

Filed: OCTOBER 4, 2001

For: COMPUTER VISION  
RECOGNITION OF METALLIC  
OBJECTS AGAINST A POORLY  
CONTRASTNIG BACKGROUND

Examiner: SPEARS, E.J.

Group Art Unit: 2878

**APPEAL BRIEF**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Appellant herewith respectfully presents a Brief on Appeal as follows:

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1. REAL PARTY IN INTEREST

The real party in interest is Koninklijke Philips Electronics N.V., a corporation of The Netherlands having an office and a place of business at Groenewoudseweg 1, Eindhoven, Netherlands 5621 BA. Koninklijke Philips Electronics N.V. is the ultimate parent of the assignee of record Philips Electronics North America Corporation, a Delaware corporation having an office and a place of business at 1251 Avenue of the Americas, New York, NY 10020-1104. Philips Electronics North America Corporation intends to further assign this application to Koninklijke Philips Electronics N.V.

2. RELATED APPEALS AND INTERFERENCES

Appellant and the undersigned attorney are not aware of any other appeals or interferences which will directly affect or be directly affected by or having a bearing on the Board's decision in the pending appeal.

3. STATUS OF CLAIMS

Claims 1-20 are currently the claims pending in the application, and are the claims on appeal. See, the Appendix. Claims 1-4 and 7-10 stand finally rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,498,586 to *Ninomiya*. Claim 13 stands finally rejected under 35 U.S.C. §103(b) as being unpatentable over *Ninomiya*. Claims 5, 6, 11, 12 and 14 stand finally rejected under 35 U.S.C. §103(b) as being unpatentable over *Ninomiya* in view of U.S. Patent No. 6,201,892 to *Ludlow*. Claims 17-

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20 stand finally rejected under 35 U.S.C. §103(b) as being unpatentable over *Ninomiya* in view of U.S. Patent No. 6,538,7650 to *Fishbaine et al.* Claims 15 and 16 stand finally rejected under 35 U.S.C. §112, ¶2 as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Claim 20 stands finally rejected under 35 U.S.C. §112, ¶1 as failing to comply with the enablement requirement.

#### 4. STATUS OF AMENDMENTS

A request for reconsideration under 37 C.F.R. §1.112 involving an amendment of claims 1, 5-7, 11, 12, 15 and 16, and an addition of claims 17-20 was filed on 4/17/2003, and entered into the application by Examiner Spears.

A request for reconsideration under 37 C.F.R. §1.116 involving an amendment of claims 1 and 17 was filed on 10/31/2003, and entered into the application by Examiner Spears.

The Appellant is filing an amendment on 01/18/2004 involving (1) an amendment of claims 15 and 16 to obviate the rejection of claims 15 and 16 under 35 U.S.C. §112, ¶2 as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention, (2) an amendment to claim 17 to obviate an outstanding objection to the drawings, and (3) an amendment of claim 20 to obviate the rejection of claim 20 under 35 U.S.C. §112, ¶1 as failing to comply with the

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enablement requirement. These amendments of claims 15-17 and 20 conform to the requirements of 37 CFR §1.116.

## 5. SUMMARY OF THE INVENTION

As illustrated in FIG. 1, a light box 26 illuminates a ball grid array ("BGA") 12 in four (4) predetermined upward and inward illumination directions with linearly polarized electromagnetic radiation in the form of light. Downwardly reflected light from solder balls 14 and substrate 16 of BGA 12 pass through an aperture 32 to a polarization filter 38. The downwardly reflected light from solder balls 14 does not pass through polarization filter 38 to a lens 30 of a camera 20 due to the fact that the reflection direction of this downwardly reflected light is not orthogonal with the four (4) predetermined upward and inward illumination directions of the linearly polarized light that illuminates BGA 12. The downwardly reflected light from substrate 16 does pass through polarization filter 38 to lens 30 of camera 20 due to the fact that the reflection direction of this downwardly reflected light is orthogonal with the four (4) predetermined upward and inward illumination directions of the linearly polarized light that illuminates BGA 12. As a result, solder balls 14 will appear substantially black to camera 20 and substrate 16 will appear substantially white to camera 20 to thereby produce a suitable contrast between solder balls 14 and substrate 16. *See, U.S. Patent Application Serial No. 09/970,960* at page 7, line 1 to page 8, line 10.

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direction that is substantially orthogonal to the first direction" as recited in independent claim 7.

Specifically, as illustrated in FIGS. 1, 3, 9 and 11, *Ninomiya* discloses linearly polarized light propagating in a non-illumination direction from source 11 through filter 12 to a mirror 13. The linearly polarized light thereafter propagates in an illumination direction from mirror 13 to chip 14 whereby the linearly polarized light is reflected from chip 14 in a reflection direction extending from chip 14 through mirror 13, a filter 15 and a lens to a TV camera 16. See, *Ninomiya* at column 12, line 47 to column 13, line 5.

Clearly, the reflection direction is orthogonal with the non-illumination direction, and the reflection direction is diametric to the illumination direction. The scope of independent claims 1 and 7 encompasses the reflection direction (i.e., the second direction of claims 1 and 7) being orthogonal with the illumination direction (i.e., the first direction of claims 1 and 7). *Ninomiya* unequivocally teaches away from the reflection direction being orthogonal to the illumination direction by teaching the reflection direction being diametric to the illumination direction. Withdrawal of the rejection of independent claims 1 and 7 under 35 U.S.C. §102(b) as being anticipated by *Ninomiya* is therefore respectfully requested.

Claims 2-4 depend from independent claim 1. Therefore, dependent claims 2-4 include all of the elements and limitations of independent claim 1. It is therefore respectfully submitted by the Applicant that dependent claims 2-4 are allowable over *Ninomiya* for at least the same reason as set forth herein with respect to independent

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6. ISSUE

Whether claims 1-14 and 17-20 are patentable over *Ninomiya*.

7. GROUPING OF CLAIMS

Claims 1-14 and 17-20 should be considered as one group.

8. ARGUMENTS

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The Appellant respectfully traverses the anticipation rejection of independent claims 1 and 7, because *Ninomiya* fails to disclose, teach or suggest "forming an image of electromagnetic radiation reflected from the part viewed through a linear polarization filter oriented for passing electromagnetic radiation that is linearly polarized in a second direction that is substantially orthogonal to the first direction" as recited in independent claim 1, and "an image forming device for forming an image of electromagnetic radiation reflected from the part viewed through a linear polarization filter oriented for passing electromagnetic radiation that is linearly polarized in a second



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claim 1 being allowable over *Ninomiya*. Withdrawal of the rejection of dependent claims 2-4 under 35 U.S.C. §102(b) as being anticipated by *Ninomiya* is respectfully requested.

Claims 5 and 6 depend from independent claim 1. Therefore, dependent claims 5 and 6 include all of the elements and limitations of independent claim 1. It is therefore respectfully submitted by the Applicant that dependent claims 5 and 6 are allowable over *Ninomiya* for at least the same reason as set forth herein with respect to independent claim 1 being allowable over *Ninomiya*. Withdrawal of the rejection of dependent claims 5 and 6 under 35 U.S.C. §103(a) as being unpatentable over *Ninomiya* in view of *Ludlow* is respectfully requested.

Claims 8-10 depend from independent claim 7. Therefore, dependent claims 8-10 include all of the elements and limitations of independent claim 7. It is therefore respectfully submitted by the Applicant that dependent claims 8-10 are allowable over *Ninomiya* for at least the same reason as set forth herein with respect to independent claim 7 being allowable over *Ninomiya*. Withdrawal of the rejection of dependent claims 8-10 under 35 U.S.C. §102(b) as being anticipated by *Ninomiya* is respectfully requested.

Claims 11, 12 and 14 depend from independent claim 7. Therefore, dependent claims 11, 12 and 14 include all of the elements and limitations of independent claim 7. It is therefore respectfully submitted by the Applicant that dependent claims 11, 12 and 14 are allowable over *Ninomiya* for at least the same reason as set forth herein with respect to independent claim 7 being allowable over *Ninomiya*. Withdrawal of the

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rejection of dependent claims 11, 12 and 14 under 35 U.S.C. §103(a) as being unpatentable over *Ninomiya* in view of *Ludlow* is respectfully requested.

Claim 13 depends from independent claim 7. Therefore, dependent claim 13 includes all of the elements and limitations of independent claim 7. It is therefore respectfully submitted by the Applicant that dependent claim 13 is allowable over *Ninomiya* for at least the same reason as set forth herein with respect to independent claim 7 being allowable over *Ninomiya*. Withdrawal of the rejection of dependent claim 13 under 35 U.S.C. §103(a) as being unpatentable over *Ninomiya* is respectfully requested.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See, MPEP §2143.

The Appellant respectfully traverses the rejections of claims 17-20, because *Ninomiya* and *Fishbaine* in combination fail to disclose, teach or suggest “an optical filter that passes electromagnetic radiation scattered by said surface mount component and linearly polarized in a second direction that is substantially orthogonal to said first direction” as recited in independent claim 17. Specifically, as previously stated herein, *Ninomiya* unequivocally teaches away from the reflection direction (i.e., the second

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direction of claim 17) being orthogonal to the illumination direction (i.e., the first direction of claim 17) by teaching the reflection direction being diametric to the illumination direction. Furthermore, *Fishbaine* clearly does not teach the aforementioned limitation of independent claim 17.

Withdrawal of the rejection of independent claim 17 under 35 U.S.C. §103(a) as being unpatentable over *Ninomiya* in view of *Fishbaine* is therefore respectfully requested.

Claims 18-20 depend from independent claim 17. Therefore, dependent claims 18-20 include all of the elements and limitations of independent claim 17. It is therefore respectfully submitted by the Applicant that dependent claims 18-20 are allowable over *Ninomiya* in view of *Fishbaine* for at least the same reason as set forth herein with respect to independent claim 17 being allowable over *Ninomiya* in view of *Fishbaine*. Withdrawal of the rejection of dependent claims 18-20 under 35 U.S.C. §103(a) as being unpatentable over *Ninomiya* in view of *Fishbaine* is therefore respectfully requested.

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Dated: February 17, 2004

Respectfully submitted,  
Michael Thomas Swab

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### APPENDIX

1. A method by which a pick and place machine visualizes a part having metallic objects against a non-metallic background comprising:  
  
    illuminating the part with electromagnetic radiation polarized linearly in a predetermined first direction, and  
  
    forming an image of electromagnetic radiation reflected from the part viewed through a linear polarization filter oriented for passing electromagnetic radiation that is linearly polarized in a second direction that is substantially orthogonal to the first direction;  
  
    whereby in the formed image, contrast between the metallic objects and the background is produced.
2. The method as claimed in Claim 1, further comprising recognizing the metallic objects in the formed image.
3. The method as claimed in Claim 1, wherein the electromagnetic radiation is light, and the image is formed by a camera.
4. The method as claimed in Claim 2, wherein the electromagnetic radiation is light, the image is formed by a camera of a computer vision system, and said recognizing is performed by the computer vision system.

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5. The method as claimed in Claim 1, wherein the part is a ball grid array, the background is dielectric, and the metallic objects are balls arranged in an array carried by the dielectric.

6. The method as claimed in Claim 2, wherein the part is a ball grid array, the background is dielectric, and the metallic objects are balls arranged in an array carried by the dielectric.

7. Apparatus for visualization of a part having metallic objects against a non-metallic background as part of a surface mount tool comprising:

one or more sources for illuminating the part with electromagnetic radiation that is linearly polarized, at least one of the sources producing electromagnetic radiation that is linearly polarized in a predetermined first direction, and

an image forming device for forming an image of electromagnetic radiation reflected from the part viewed through a linear polarization filter oriented for passing electromagnetic radiation that is linearly polarized in a second direction that is substantially orthogonal to the first direction,

whereby in the formed image, contrast between the metallic objects and the background is produced.

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8. The apparatus as claimed in Claim 7, further comprising a computer vision system for recognizing the metallic objects in the formed image.
9. The apparatus as claimed in Claim 7, wherein the electromagnetic radiation is light, and the image forming device is a camera.
10. The apparatus as claimed in Claim 8, wherein the electromagnetic radiation is light, and the image forming device is a camera of the computer vision system.
11. The apparatus as claimed in Claim 7, wherein the part is a ball grid array, the background is dielectric, and the metallic objects are balls arranged in an array carried by the dielectric.
12. The apparatus as claimed in Claim 8, wherein the part is a ball grid array, the background is dielectric, and the metallic objects are balls arranged in an array carried by the dielectric.
13. The apparatus as claimed in Claim 8, further comprising a manipulator for positioning the part on a circuit board or card with recognized metallic objects of the part in registration with contact pads of the board or card.